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NPIC/TSSG/DED-1066-68
7 February 1968

MEMORANDUM FOR: See Distribution

SUBJECT : Use of the [] Compact Variable Anamorphic
Eyepieces

1. The enclosed copies of instructions for using the [] Anamorphic Eyepieces are sent to you for distribution to personnel utilizing these eyepieces. Please have your workers spend a few minutes to read and familiarize themselves with the suggested procedure.

2. The instruction paper in its present form is a temporary item for trial use. We would appreciate any comments or recommendations concerning changes or improvements in these instructions which would make learning the optimum use of these eyepieces faster and easier. If the instructions prove useful, we will publish them in formal form.

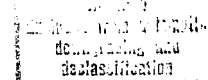
3. There are [] copies enclosed for your distribution; if any more are needed, please contact []

[]
Chief, Technical Services & Support Group,
NPIC

Distribution:

- 1 - Asst/PAG
- 1 - DC/DDI/IAS
- 1 - DC/TID
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NGA Review Complete



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25 January 1968

PROCEDURE FOR SETTING UP ANAMORPHIC EYEPIECES

25X1
25X1

1. Due to the intricate geometries of modern camera systems, some of the stereo imagery currently obtained is, for all practical purposes, unfusable. However, if an anamorphic optical system is used to introduce a deliberate (controlled) distortion of the optical images, the unfusable imagery will become fusible. The [] Compact Variable Anamorphic Eyepieces (See Fig.1) are such an optical system. The eyepieces are designed for attachment to the [] Zoom 70 Stereoscope and contain two separate operating controls--the Anamorphic Zoom Control for changing magnification of the image in one direction (only) and the Azimuth Control for rotation of the image about the optical axis; i.e., rotating the axis along which the anamorphism (stretch) will take place. The following will serve as a guide for obtaining optimum stereo fusion throughout the field of view.*

- a. Set the Zoom Control of both anamorphic eyepieces to 1X magnification. (This setting allows the images to appear as they normally would without the anamorphic eyepieces; i.e., the X and Y scales will be equal).
- b. Orient the film chips for normal stereo viewing (i.e., so that the photo base is parallel to the eyebase).
- c. Notice in which directions the left and right images must be stretched or compressed in order to improve the stereo fusion--over the entire field of view.
- d. Working with one eyepiece and then the other, rotate the Azimuth Control while repeatedly increasing and decreasing the anamorphic magnification Zoom Control until each image has roughly the same orientation of the anamorphic axis and have the same degree of anamorphic magnification. NOTE: Rotating the Azimuth Control Clockwise rotates the optical image counterclockwise.
- e. While blinking one eye and then the other, make the final adjustments until (1) the image throughout the field of view appears to fuse completely (remain at the same location) and (2) the eyestrain is the least. These adjustments may involve slight changes in any or all of the following: (1) the zoom magnification, (2) the azimuth rotation, (3) the orientation of the film chips (move one of the chips), and (4) the

*NOTE: Before proceeding with adjustments of the Anamorphic eyepieces it is absolutely essential that the Zoom 70 be properly focused; the independent zoom be set at a common setting; and the Common Zoom be set at a magnification commensurate with the scale of the photography.

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overall size of one image (for this correction use the independent zoom controls on the Zoom 70 pod). The less anamorphic magnification that is required to obtain complete stereo fusion, the more true-to-life will be the shapes and sizes of the images.

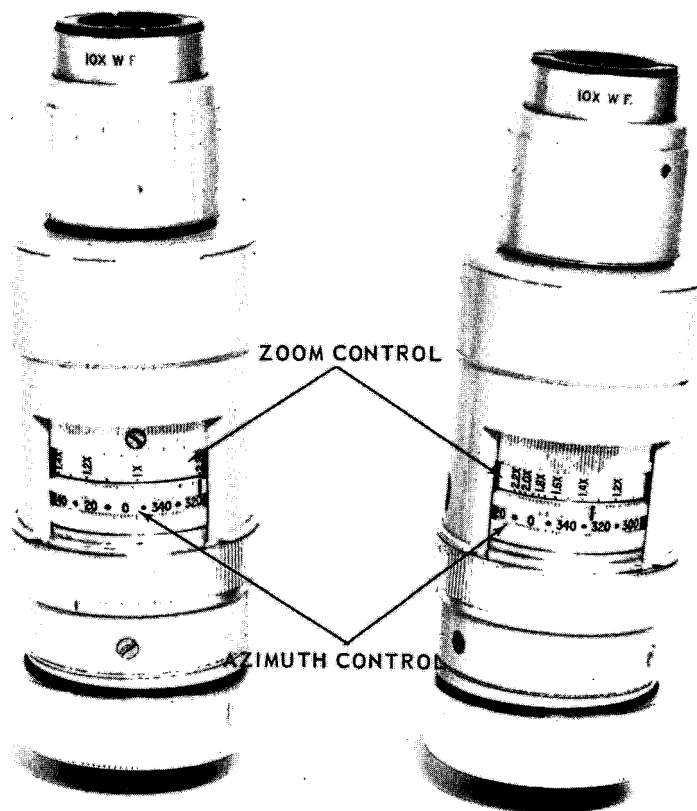
- f. For quick future reference--of the same images using the same anamorphic eyepieces--record the correct values of the anamorphic zoom magnification and the azimuth rotation and mark on the film chip holder its orientation parallel to the eyebase. Thus, using these settings with just a slight readjustment, the images can be quickly brought to complete fusion again.

2. To help with the orientation procedure, a slight understanding of how anamorphic eyepieces work is useful. The Compact Variable Anamorphic Eyepieces contain glass prisms and lenses (Fig. 2) such that they provide different focal lengths (i.e., different magnifications) in mutually perpendicular planes containing the optical axis. Magnification occurs in the plane perpendicular to the sharp edges of the prisms while no prismatic effect exists in the plane parallel to the edges (See Fig. 3). The effects of anamorphism are shown in Figure 4. If the images before anamorphism are similar to those in black, then magnification in the given azimuth direction will cause them to appear like those in green. Also, if the figures before anamorphism are similar to those in green, then magnification in the given direction will cause them to appear like those in black. It is interesting to note that rotating the Azimuth Control while holding the Zoom Control at a constant value will cause the imaged point to follow a path which forms a circle.

3. With practice any distorted imagery can easily be made to fuse in a matter of seconds.

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NPIC M-1520

FIGURE 1. COMPACT VARIABLE ANAMORPHIC EYEPIECES

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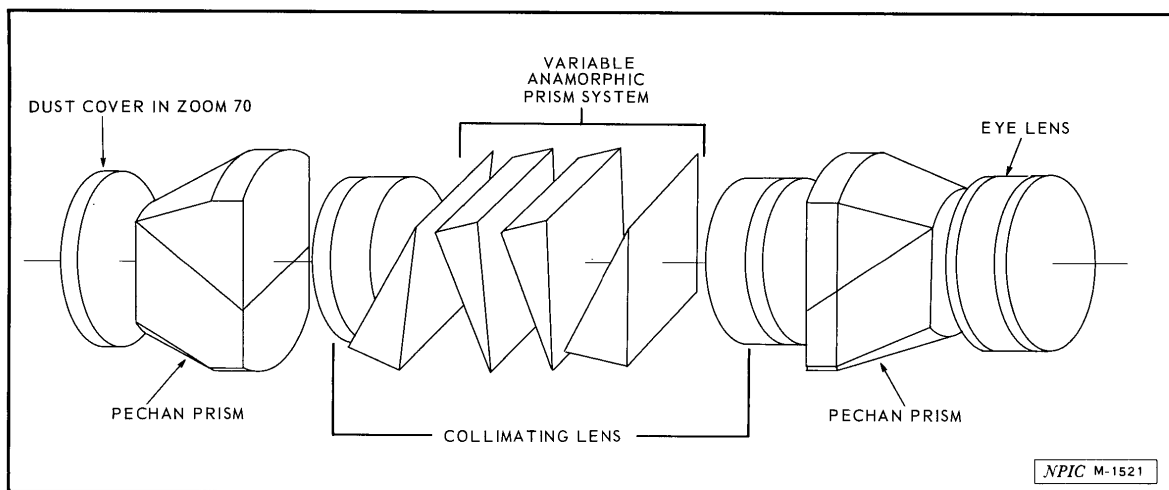


FIGURE 2. PRISM ANAMORPHISM

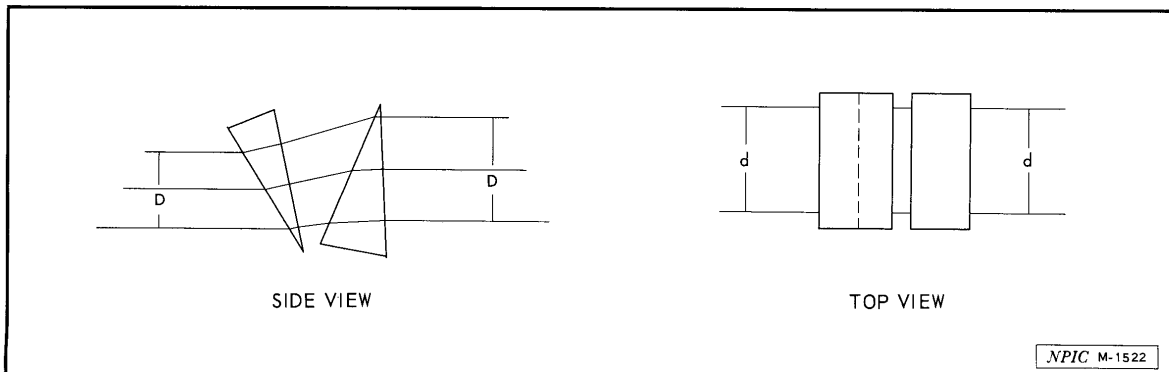


FIGURE 3

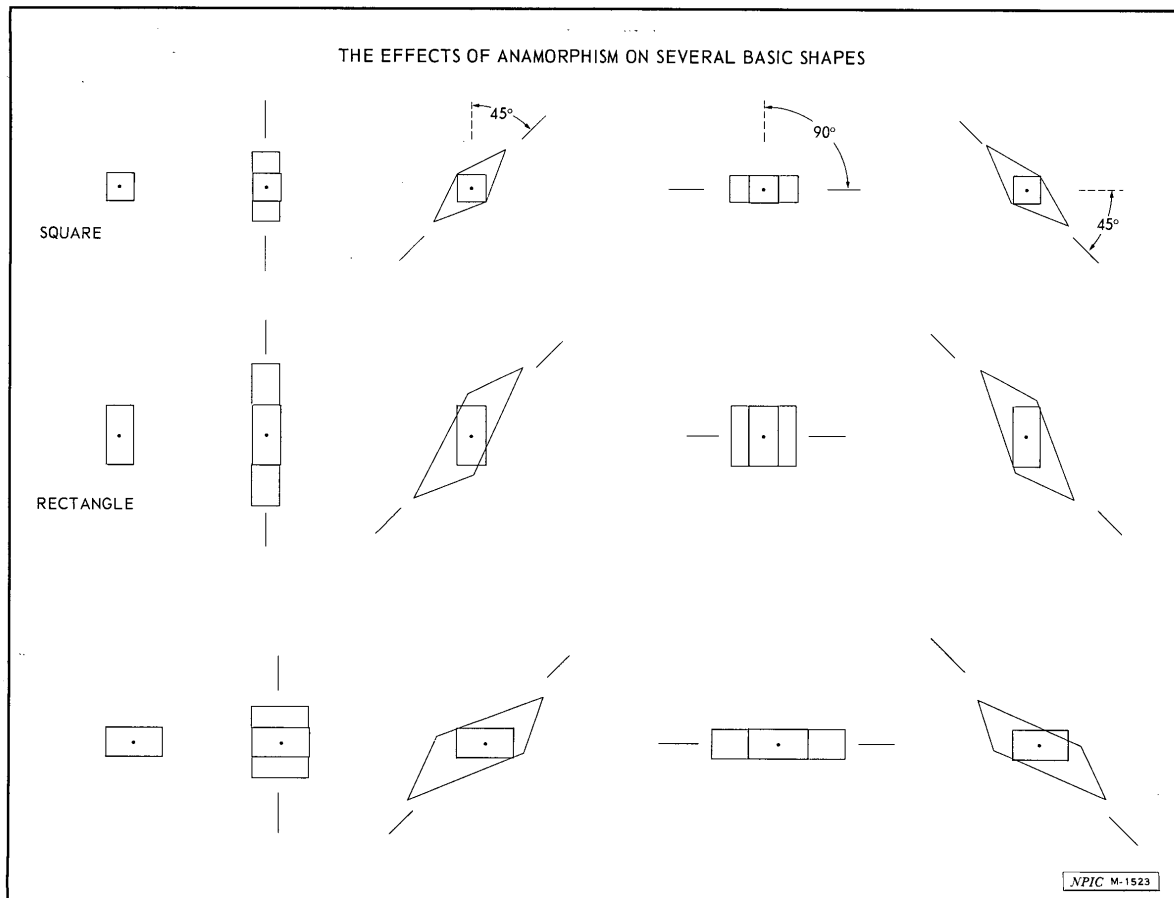


FIGURE 4a

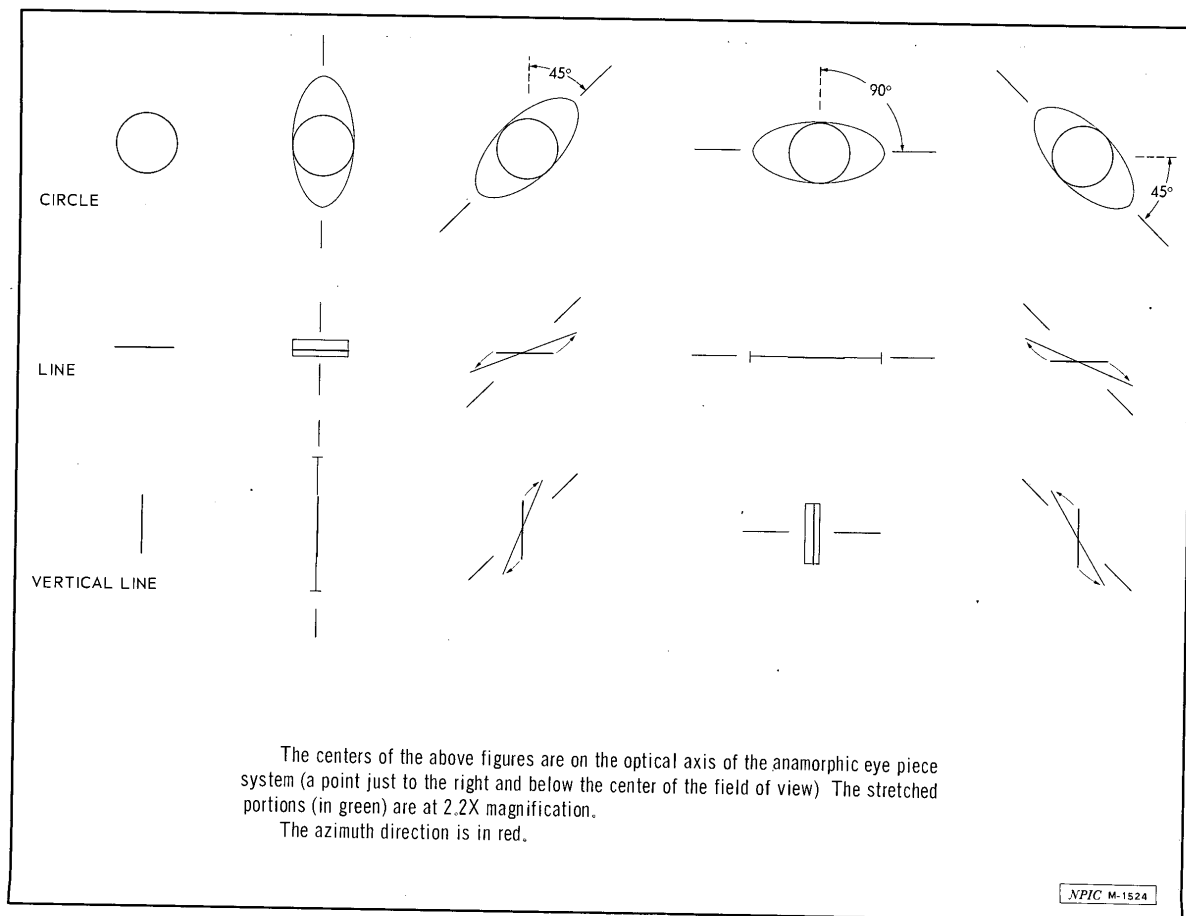


FIGURE 4b